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ABSTRACT

This paper focuses on Smith's (1982) concept of test-wiseness strategies, describing several approaches that may maximize guessing on multiple-choice exams. Several previous studies indicated that the average level of performance increased when guessing was encouraged and decreased with instructions advising against guessing. Several studies were conducted to determine if test-wiseness can be taught. In each study, the test-wiseness training presented methods for using logical reasoning procedures in order to maximize guessing. In the first study, college students were administered the questions only from a standardized reading comprehension test (the reading selections were omitted). In the second study, in-class, teacher-made tests were used to measure change. In the third study, middle school social studies students were administered teacher-made tests. There were no strong effects in any of the studies. Factors affecting these outcomes are discussed. (BW)

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Teaching Testwiseness

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Testwiseness is described as a cognitive ability or set of skills that a test-taker can use to improve his/her score no matter what the content area of a test (Sarnacki, 1979). The testwise test-taker is able "to utilize the characteristics and formats of the test and/or test-taking situation to receive a high score" (Millman, Bishop and Ebel, 1965). Since testwiseness is a characteristic of the test-taker, the student who is low in testwiseness is also penalized for this deficit during every testing situation (Crehan, Koehler and Slakter, 1974; Moore, Schutz and Baker, 1966).

While some students complain that they are unable to achieve high test scores despite knowing the material, others are able to do well on tests even though their level of preparation is less than adequate. Current research speculates on the existence of a characteristic labeled testwiseness, i.e., an ability of the test-taker to perform at a better than chance level on a multiple choice test no matter what the content being tested. (The following comments concerning testwiseness will refer specifically to performance on four item multiple choice tests.)

When examining the interaction of a multiple choice test situation from the standpoint of the item, problems are considered to result from poor test construction. However, viewing the interaction from the test-taker's perspective, problems are the result of a lack of knowledge or testwiseness. "More error in measurement is likely to originate from students who have too little, rather than too much, skill in taking tests" (Ebel, 1965). Testwiseness does not appear to be a pervasive skill

but is rather cue specific (Diamond and Evans, 1972). Therefore, attempting to instruct students in testwiseness is likely to result in more validity for the measuring instrument, since "the student low in testwiseness tends to be penalized every time he takes a test which involves a test-wiseness component" (Crehan, et al., 1974).

Smith (1982a) suggests that the cognitions of skilled test-takers consist of:

> "1. the cognitive monitor which controls which skills are going to be brought to bear on the (test) item which is under consideration (metacognition),
> 2. the abilities and skills that the individual has which relate to the trait being measured (knowledge),
> 3. the set of testwiseness strategies which the individual has determined are relevant to the authors of the test (testwiseness),
> 4. the response of the individual (the selection and record of a choice) and the refinement of the individual's assessment of the author's item writing style" (p.5).

"There are various routes to determining which responses to select on a multiple choice test, and a superstructure exists for monitoring which routes are utilized" (Smith, 1982a). The process works like this. A test-taker reads the stem of the multiple choice item and then attempts to recognize the answer among the list of options. If the answer is not found, a skilled test-taker will next try to analyze the question using his/her cognitive monitor, combining that information with whatever test-wiseness strageties she/he possesses. A choice is made and then integrated with the knowledge and judgments the test-taker has made concerning the intent and style of the test author. This process measures the trait ostensibly being tested, true, but many other characteristics of the test-taker enter into the final score received on an objective examination.

GUESSING

The remainder of the paper will focus on Smith's (1982a) concept

of testwiseness strategies, attempting to describe several approaches that may maximize guessing on multiple choice exams. Millman, et al., (1965) noted that if examinees wish to maximize their test scores, they must be able to use an appropriate guessing strategy. Increasing the likelihood of guessing correctly offers the only socially sanctioned option for achieving a higher score when one is actually taking a test. Hence, strategies for guessing become important.

Individual differences in risk-taking behavior are a source of variance in test scores. Testwise students tend to guess more often than their naive counterparts, and as a result, obtain higher scores (Hammerton, 1965; Bauer, 1973). Since testwise students are more likely to guess, they can be expected to obtain higher scores than equally competent people who lack test sophistication (Moore, et al., 1966).

When students are told they will be given a multiple choice test, they may ask if they will be penalized for guessing. Usually students are advised not to guess on standardized multiple choice tests (Ford, 1973). Sheriffs and Boomer (1954) showed that when test-takers are requested to respond to items previously omitted, their mean test score increases. Michael (1972) found that the average level of performance increased when guessing was encouraged and decreased with instructions advising against guessing. Ebel (1965) concludes from his study with true-false tests that "students seeking highest scores on a test are well advised to answer all questions even when the usual correction is applied (their blind guesses to true-false items tend to be correct more than half of the time)." Slakter (1968) sought to determine which guessing strategy would result in a higher test score. The results demonstrated that the "high guessing" group averaged five points more than

the "usual guessing" group, indicating that the guessing effect was significant. It appears that a test-taker would tend to increase his/her test score by answering all items, even though a penalty for incorrect responses may be applied to the final score.

The problem to solve now becomes "How does a test-taker decide which answer is the best guess?" She/he needs to discover a procedure to eliminate wild guessing and encourage educated guessing. Smith (1982b) suggests that wild guessing would provide only a one in four chance of success, while educated guessing can improve the test-takers odds of a correct choice to one in two.

Numerous testwiseness suggestions are provided by Millman's (1969) and Smith's (1982b) guidelines. Millman advises test-takers to consider the following characteristics of each option when guessing at the response to a multiple choice item: inclusivity, length of options, degree of qualification, amount of generalization, physical position, logical position, similarity or oppositeness, phraseology, language, grammar, emotive ideas and ridiculous ideas.

Smith (1982b) describes a process labeled the convergence strategy. To use the convergence strategy, the test-taker must be able to analyze the logical relationships of all options and group them accordingly. The correct choice then becomes the item that appears in every grouping. The convergence strategy takes advantage of an inherent limitation of multiple choice items, i.e., logical distractors must be provided along with the correct answer. A common method of generating distractors is to examine the nature of the correct choice and then vary its characteristics slightly. A testwise individual will analyze the relationships of

options using both the specific knowledge being tested and general fund knowledge. Smith has developed an instrument to use for research on the convergence strategy which provides students with only four options, i.e., no stem is printed in order to force students to consider the relationships of options to each other.

A further application of the guessing strategy suggests guessing whenever the test-taker may eliminate one or more of the options as incorrect. Successful elimination of options increases the probability that the option selected will be the correct one. Commenting on risk-taking in general, the Miliman et al., (1965) taxonomy, summarized above, seems to suggest that testwiseness is a function of the examinee's ability to determine when it is profitable to guess and when it is not. However, Ebel (1968) indicated that examinees rarely guess blindly, and that guessing may be more profitable than not guessing (Slakter, 1968). This seems to indicate that the test-wise individual is not the person who strategically picks his or her spots to guess. "Instead, the test-wise individual is the examinee who is aware that although some guesses have a greater probability of being correct than others, test scores in general are maximized by employing a consistently liberal guessing strategy" (Sarnacki, 1979).

Apparently, the test-wise individual may be a risk-taker, but it does not necessarily follow that the risk-taker is necessarily test-wise.

RESEARCH IN PROGRESS

Several studies have been conducted to determine if testwiseness can be taught. All studies used the non-equivalent control groups design, with random assignment to experimental or control conditions. The

treatments were lecture/discussion presentations involving the testwiseness guidelines developed by Millman (1969) and Smith (1982), already described above. In general, the testwiseness training presented methods for using logical reasoning procedures in order to maximize guessing.

The first study, using forty college seniors as subjects, showed the experimental subjects improved over the controls at a .07 level of significance, analyzing the data by ANCOVA using the pre-test scores as covariate. In order to isolate the skill of testwiseness, the questions only from a standardized reading comprehension test were presented to the subjects. Normal procedure involves giving students a few paragraphs of printed material to read, and then requiring them to respond to questions based on the material--a typical reading comprehension approach. For purposes of this study, students were not given the reading selections, but were required to answer the comprehension questions. This approach was used in order to test for the impact of testwiseness on standarized achievement test scores. Since the questions covered relatively obscure material, few students were expected to possess knowledge of the content. Experimental subjects improved their scores an average of almost eleven percentage points for pre- to post-test. Controls improved less than six points on the post-test on the average. Though significance was not achieved, a strong trend existed to suggest that testwiseness strategies could be taught, and used, to achieve an increase in scores on standarized achievement tests (Williams and Dolly, 1983).

The second study conducted utilized 93 college sophomores as subjects. The design and treatment were identical to the first study. Instead of solving the small "n" problem, this group provided data demonstrating

that the testwiseness treatment was not helpful to the experimental group. However, the pre- and post-tests were not the reading comprehension exam as in the first study. Rather, regularly scheduled, in-class, teacher-made tests were used to measure change.

In order to investigate the phenomena further, the treatment was abridged in scope and offered to middle school social studies students. Middle school students are capable of understanding and using testwiseness strategies (Slakter, et al., 1970). Junior high students have been identified as the most appropriate subjects for testwiseness intervention (Sarnacki, 1979). As grade level increases beyond the ninth year, so does performance on testwiseness measures. Increases in testwiseness over grade level may be due to greater experience with tests, maturation, and/or the loss of lower achievers in the higher grades (Slakter, et al., 1970). Providing middle school students with access to testwiseness strategies may improve their test performance and facilitate greater adjustment in the classroom for the high school years. This study examined the relationship between pre- and post-test scores on teacher-made tests taken by middle school students after half of the group received training in testwiseness strategies. Researchers attempted to evaluate the impact of testwiseness training on test scores obtained by middle school students after the testwiseness training program. Scores of the experimental group were hypothesized to increase more on the post-test than scores of the control group.

Students assigned to the control conditions were sent to the school library for 45 minutes of reading on any topic other than social studies. The experimental group was presented with a lecture and practice materials

detailing specific aspects of testwiseness strategies. The strategies advocated the use of deductive reasoning when attempting to guess an answer to either multiple choice items or true-false questions. Emphasis was placed on the principle that one should only use a testwiseness strategy if one is unable to use knowledge as a basis for selecting the correct answer (Slakter, 1968; Smith, 1982b).

The deductive reasoning strategies taught to the students were absurd options (Gibb, 1964), similar options (Millman, 1969), specific determiners (Slakter, et al., 1970) and the convergence strategy (Smith, 1982b).

1) Absurd options can be eliminated as incorrect choices, and thus, increase the probability of choosing the correct answer.

2) Identifying similar, but slightly different, options again narrows down the possibility of choosing incorrect answers.

3) Specific determiners, e.g., always, never, all, are words which provide cues to the likely correctness of choices, especially on true-false items.

4) The convergence strategy, recently developed by Smith (1982b), involves teaching test-takers to examine all choices presented after the stem of a multiple choice question in order to analyze the relationships of the distractors to each other and thereby, identify the choice most likely to be correct.

Deductive reasoning strategies allow a test-taker to acquire points beyond those achieved through direct knowledge of the subject matter. However, deductive reasoning is dependent on some knowledge of the tested material and, thus, minimizes wild guessing. In general, the treatment attempted to teach a group of strategies that would optimize guessing, using Millman's (1969) taxonomy of test-taking skills as general back-

ground information. Results showed the experimentals outperforming the controls on the post-test but at a non-significant level.

Current research is attempting to determine if the abridged version of the treatment will be beneficial to college freshmen.

DISCUSSION

This lack of a strong effect may be due to several factors. Millman, et al., (1965) found that the average gain after a training program in test-taking skills is much higher for subjects "genuinely unsophisticated about tests to begin with." It is unreasonable to think that college seniors are naive in test-taking skills. Hence, research with lower division college students and middle school students was conducted also.

The majority of the work on testwiseness has attempted to evaluate the level of testwiseness that a test-taker possesses by testing for testwiseness. Hence, there exists a great deal of abstract data on who shows what degree of testwiseness, at what grade level, etc., but few studies actually attempt to measure a subject's ability to improve his or her test score after a testwiseness training program, as was attempted in the present study. No research was located measuring the effect of testwiseness on teacher-made tests.

Middle school students take more teacher-made tests than standardized achievement tests. Since the test-writing skills of teachers are not as well developed as those of professionals, item flaws inevitably occur (Mehrens and Lehmann, 1973). Should an efficient program for testwiseness training be developed, the accuracy of academic skills measurement could be greatly increased. Ebel (1965) maintains that "more error in measurement is likely to originate from students who have too little, rather

than too much, skill in test-taking." Teaching deductive skills could improve scores of students low in testwiseness and equalize their performance with peers of similar ability.

"Testwiseness encompasses both the method of measurement and the characteristics of the test-taker" (Sarnacki, 1979). A great deal of work has focused on the former, but only recently has the test-taker been subject to scrutiny. Only a low to moderate positive correlation exists between intelligence and testwiseness, while verbal achievement and testwiseness appear to be more closely related (Diamond and Evans, 1972; Bajtelsmit, 1975). Perhaps testwiseness is a manifestation of a person's risk-taking behavior. Omvig (1974) and Smith (1982b) both speculate that learning test-taking skills may have a twofold impact by providing students with new skills as well as increasing motivation and self-confidence.

Perhaps certain characteristics must be present in students in order to enable them to profit from testwisness training. Bajtelsmit (1977) found an interaction between treatment conditions of testwiseness training and desensitization of test anxiety. Subjects who receive both treatments scored lower than subjects receiving either treatment by itself. Presenting subjects with several approaches to test-taking may "create conflicting orientations and overwhelming situational complexity" (Bajtelsmit, 1977), which may have a deleterious effect on test performance. He recommends that "Future studies might investigate the validity of specific testwiseness strategies in different examination contexts, i.e., which strategies account for meaningful score variance on which tests under what conditions."

The information being accumulated on testwiseness seems to highlight

the complexity of the phenomena. People must take multiple choice tests to be permitted to drive a vehicle, to get out of high school, to get into graduate school, to obtain certification to nurse, to join the police force and to perform numerous other tasks of significance for themselves and society. It behooves us to learn more about what we are measuring when we administer multiple choice tests.

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